AMENDMENTS TO THE CLAIMS

A detailed listing of all claims that are, or were, in the present application, irrespective of whether the claim(s) remain(s) under examination in the application is presented below. The claims are presented in ascending order and each includes one status identifier. Those claims not cancelled or withdrawn but amended by the current amendment utilize the following notations for amendment: 1. deleted matter is shown by strikethrough for six or more characters and double brackets for five or fewer characters; and 2. added matter is shown by underlining.

1.   (Currently Amended) A method of processing seismic data representing a physical system, the method comprising:

forming a difference between first and second <u>measurements of</u> seismic data representing the system in first and second states, respectively; and

inverting the difference in accordance with a parameterised model of the physical system to obtain changes in the parameters of the model.

2.   (Original) A method as claimed in claim 1, wherein the first and second states represent the physical system at different times.

3.   (Previously Presented) A method as claimed in claim 1, wherein the inversion is performed in a statistical environment.

4.   (Original) A method as claimed in claim 3, wherein the inversion is a least squares inversion.

5.   (Original) A method as claimed in claim 3, wherein the inversion is a Bayesian inversion.

6.   (Previously Presented) A method as claimed in claim 4, wherein a first part of the solution to the inversion is a posterior expectation.

7.   (Original) A method as claimed in claim 6, wherein the posterior expectation corresponds to changes in the parameters of the model.

8.   (Previously Presented) A method as claimed in claim 4, wherein a second part of the solution to the inversion is a posterior covariance.

9.   (Original) A method as claimed in claim 8, wherein the posterior covariance corresponds to the uncertainty in the posterior expectation.

10.   (Previously Presented) A method as claimed in claim 1, wherein changes in the parameters of the model follow Gaussian statistics.

11.   (Previously Presented) A method as claimed in claim 1, wherein the difference has an associated error model with a corresponding error term.

12.   (Original) A method as claimed in claim 11, wherein the error term corresponds to the difference between (i) the difference between the first and second measured data, and (ii) the changes in the parameters of the model when operated upon by a forward modelling operator.

13.   (Previously Presented) A method as claimed in claim 11, wherein the error term e is related to the difference d between the first and second measured data and the changes B in

the parameters of the model when operated upon by a forward modelling operator G via the matrix-vector expression d = Go + e.

14. (Previously Presented) A method as claimed in claim 11, wherein the statistical properties of the error term is described via an expectation and a covariance.

15. (Original) A method as claimed in claim 14 wherein the error term follows Gaussian statistics.

16. (Previously Presented) A method as claimed in claim 11, wherein the error term is used to determine the posterior expectation.

17. (Previously Presented) A method as claimed in claim 11, wherein the error term is used to determine the posterior covariance.

18. (Previously Presented) A method as claimed in claim 11, wherein the physical system has a part which is the same in the first and second states, measurements of this part being used to determine statistical properties of the error term.

19. (Currently Amended) A method as claimed in claim 1, wherein [[the]] prior knowledge about the changes of the parameters of the model is defined in a prior model.

20. (Original) A method as claimed in claim 19, where the prior model is defined via a prior expectation and a prior covariance.

21. (Original) A method as claimed in claim 20, where the prior model follows Gaussian statistics.

22. (Currently Amended) A method as claimed in claim 19, <u>wherein a first part of a solution to the inversion is a posterior expectation and</u> where the prior model for the changes of the parameters of the model is used to determine the posterior expectation.

23. (Currently Amended) A method as claimed in claim 19, <u>wherein a second part of a solution to the inversion is a posterior covariance and</u> where the prior model for the changes of the parameters of the model is used to determine the posterior covariance.

24. (Previously Presented) A method as claimed in claim 1, wherein the seismic data are reflection data.

25. (Previously Presented) A method as claimed in claim 1, wherein the parameters of the model are any complete set of elastic properties that can be used to formulate a linear expression of reflectivity.

26.   (Original) A method as claimed in claim 25, wherein the parameters of the model are the P-wave velocity, the S-wave velocity, and the density.

27.   (Original) A method as claimed in claim 25, wherein the parameters of the model are the acoustic impedance, the shear impedance, and the density.

28.   (Previously Presented) A method as claimed in claim 1, wherein the physical system includes a region containing a hydrocarbon reservoir.

29.   (Previously Presented) A method as claimed in claim 1, wherein the obtained changes in the parameters of the model are used to assess where changes in the physical system have occurred between the first and second states.

30.   (Previously Presented) A method as claimed in claim 29, wherein the obtained changes in the parameters of the model are used to assess the change in hydrocarbon content in the hydrocarbon reservoir.

31.   (Previously Presented) A method as claimed in claim 1, wherein the obtained changes in the parameters of the model are used to assess the probabilities of changes in the physical system between the first and second states.

32.   (Original) A method as claimed in claim 31, wherein the probabilities of changes in the physical system are used to generate a probability density map of changes in the physical system.

33.   (Previously Presented) A program for controlling a computer to perform a method as claimed in claim 1.

34.   (Original) A program as claimed in claim 33 stored on a storage medium.

35.   (Original) Transmission of a program as claimed in claim 33 across a communications network.

36.   (Currently Amended) A computer programmed to perform a method as claimed in [[anyone of]] claim 1.

37.   (Currently Amended) An apparatus for processing data representing a physical system, the apparatus comprising:

        a computer-implemented means for forming a difference between first and second measured data representing the system in first and second states, respectively; and

a computer-implemented means for inverting the difference in accordance with a parameterised model of the physical system to obtain changes in the parameters of the model.